IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PACKET INTELLIGENCE LLC	)(	CIVIL DOCKET NO.
	)(	
	)(	2:16-CV-147-JRG
	)(	
	)(	
VS.	)(	MARSHALL, TEXAS
	)(	
	)(	
	)(	
SANDVINE CORPORATION AND	)(	NOVEMBER 7, 2017
SANDVINE INCORPORATED ULC	)(	8:30 A.M.

TRANSCRIPT OF JURY TRIAL

BEFORE THE HONORABLE JUDGE RODNEY GILSTRAP

UNITED STATES DISTRICT JUDGE

APPEARANCES:

FOR THE PLAINTIFF:
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(Proceedings recorded by mechanical stenography, transcript produced on CAT system.)

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P R O C E E D I N G S

(Jury out.)

COURT SECURITY OFFICER: All rise.

THE COURT: Be seated, please.

All right. Are the parties prepared to read into the record those items from the list of pre-admitted exhibits used during yesterday's portion of the trial?

MR. HARTSELL: Yes, Your Honor.

THE COURT: All right. If you'll proceed.

MR. HARTSELL: Yesterday's exhibits are PTX-3, 3A, 7, 7A, 9, 9A, 113, 163, 284, 320, 326, 327, 334, 336, 338, 339, 340, 342, 344, 347, 350, 354, 356, 357, 359 through 60, 362, 366, 379, 381, 384, 385, 388, 394. And DX-44 and DX-255.

THE COURT: All right. Is there any objection to that rendition by the Defendant as offered from the Plaintiff?

MR. GILLAM: No, Your Honor, there's not.

THE COURT: Does Defendant have a similar rendition to offer?

MR. GILLAM: No, Your Honor, we have nothing else to add.

THE COURT: All right. Do I understand, Counsel, there's a need to read certain other items into the record at this point?

MR. DAVIS: Yes, Your Honor, there's some discovery responses.

THE COURT: Okay. If you'll proceed, Mr. Davis. Or Mr. Skiermont, that's fine.

MR. SKIERMONT: There's just a handful of requests for admission, Your Honor.

Request for Admission No. 1: Admit that you train your customers to use the accused instrumentality in the United States.

Response to our RFA No. 1: Admitted that Sandvine offers training courses and admit that some such training occurs in the United States.

Request for Admission No. 9: Admit that the -- all versions of source code loaded on the source code computer in Overland Park office represents production versions of the source code for the accused instrumentality.

Response: Admitted.

Request for Admission No. 21: Admit that you sell the accused instrumentality in the United States.

Response: Admitted.

Request for Admission No. 22: Admit that you offered the accused instrumentality in -- for sale in the United States.

Response: Admitted.

Request For Admission No. 23: Admit that you have used the accused instrumentality in the United States.

Response: Admitted.

That's all, Your Honor.

THE COURT: Any objection -- any objection to that from Defendants?

MR. BURESH: No, Your Honor.

THE COURT: All right. Do we have all eight members of our jury present, Mr. Nance?

COURT SECURITY OFFICER: We do, sir.

THE COURT: All right. Let's go off the record just a minute.

(Off the record discussion.)

THE COURT: Let's go back on the record.

The Court's going to take a brief recess.

The Court stands in recess.

COURT SECURITY OFFICER: All rise.

(Recess.)

COURT SECURITY OFFICER: All rise.

THE COURT: Be seated, please.

All right. Mr. Nance, bring in the jury, please.

COURT SECURITY OFFICER: All rise for the jury.

(Jury in.)

THE COURT: Good morning, and welcome back, ladies and gentlemen. Please have a seat.

Plaintiff, call your next witness.

MR. DAVIS: Your Honor, at this time Plaintiffs call Mr. James Bergman to the stand.

THE COURT: All right. Mr. Bergman, if you'd come forward and take the witness stand. You've

previously been sworn, correct?

THE WITNESS: Correct.

THE COURT: Please have a seat.

Do we have notebooks to press -- to pass out?

MR. DAVIS: I do, Your Honor.

THE COURT: Let's do that.

We have an issue with the IT person who's waving at somebody, not me.

MR. HARTSELL: May we approach?

THE COURT: Yes, you may approach.

All right. Counsel, you may proceed with your direct examination.

MR. DAVIS: Thank you, Your Honor.

JAMES BERGMAN, PLAINTIFF'S WITNESS, PREVIOUSLY SWORN

DIRECT EXAMINATION

BY MR. DAVIS:

Q. Good morning, Mr. Bergman.

A. Good morning, Mr. Davis.

Q. Would you please introduce yourself to the jury?

A. My name is Jim Bergman.

Q. What do you do for a living, Mr. Bergman?

A. I'm an economist that specializes in the valuation of intellectual property, things like trade

secrets, patents. Frequently this occurs in the context of litigation.

Q. Are you a married man?

A. I am. My wife and I will be celebrating our 20-year anniversary next month.

Q. And do you have any children?

A. I do. I have a 15-year-old girl who just started high school, and a 10-year-old boy.

Q. Were you retained as an expert in this case by Packet Intelligence?

A. I was.

Q. And what were you asked to do?

A. I was asked to determine the amount that would be due to Packet Intelligence if Sandvine were found to have infringed the patents.

Q. How are you compensated for your work on this case?

A. On an hourly basis.

Q. And does your compensation in this case depend on any opinion that you arrive at?

A. It does not.

Q. What is your hourly rate?

A. $580 an hour.

Q. Now, prior to Packet Intelligence retaining you in this case, did you know Packet Intelligence?

A. No.

Q. Did you know Mr. Vachon or Mr. Brunell?

A. No.

Q. Did you know any of the lawyers that represent Packet Intelligence?

A. No.

Q. Now, did you prepare a set of slides to assist with your testimony today?

A. Yes, I did.

Q. Before we discuss your opinions, can you tell us a little bit about your employment history?

A. Sure. I am currently the founder and president of Bergman Consulting which is a firm I started at the beginning of this year.

Prior to that, I was the former head of the intellectual property group at the global financial company Conway MacKenzie.

Prior to that, I worked in-house at a number of law firms as an economic expert, both -- the law firms were national and global in nature.

And before that, I spent 10 years in information technology, primarily as a network engineer.

Q. Could you describe your education, please?

A. Yes, I have a Master's degree from the University of California at Irvine, a Master's in

Business Administration. My undergraduate degree is in economics, also from UC Irvine. And I'm currently pursuing a Master's in Computer Science from Georgia Tech.

Q. Do you hold any professional designations?

A. Yeah, I'm a charter financial analyst, which is a certification that requires four years of work experience and 18 hours' worth of examinations on topics like accounting, economics, statistics, finance. And prior to that, former life, I was a Microsoft certified systems engineer.

Q. Are you a member of any professional organizations?

A. Yes, I am a member of the Licensing Executive Society.

Q. How many years have you worked as an economist analyzing and valuing business transactions with a focus on intellectual property?

A. It's been over 13 years.

Q. And in your more than 13 years of experience, how many types of -- of these valuations have you performed?

A. At least 50.

Q. And in those 13 years of experience, how many patent license agreements have you reviewed and analyzed

for valuation purposes?

A. Hundreds.

Q. How are your education and work experience relevant to your testimony here today?

A. I think primarily my education and work experience really help inform me to determine the proper methodologies for determining a reasonable royalty in a case like this.

Q. Do you typically work more for plaintiffs or defendants in these types of cases?

A. I do work for both plaintiffs and defendants, but I would say most of my work is for plaintiffs.

Q. And have you ever testified in United States District Court today -- before today?

A. Yes, sir.

Q. What information did you review to perform your analysis in this case?

A. Similar to the testimony that you heard from Dr. Almeroth yesterday, as to the things that he reviewed, I looked at thousands of Sandvine's internal documents as part of my analysis. I reviewed the patents-in-suit. Looked at various court filings that are relevant for my analysis. I had interviews with both Packet Intelligence and Dr. Almeroth to get a better understanding for my analysis. Looked at the

deposition testimony of Sandvine's witnesses, as well as Packet Intelligence. I looked at Sandvine's publicly available information, as well as information on the industry as a whole and the market as a whole because that's important for my analysis. I looked at relevant licensing agreements and reviewed all the expert reports -- reports in the case.

Q. How much time have you spent reviewing and analyzing the evidence in this case in preparation for your opinions and testifying here today?

A. I'd say that people -- that myself and people working under my direction, I probably spent 350 to 400 hours working on this case.

Q. And what percentage of those hours were hours that you personally spent?

A. 90, 95 percent.

Q. What is your overall opinion in this case as to the amount of damages for patent infringement?

A. It's my opinion that the amount due to Packet Intelligence, if they're -- if Sandvine is found to infringe the patents-in-suit, would be a lump-sum payment of $13.89 million.

Q. Now, what is a lump-sum payment?

A. A lump-sum payment is an amount that -- is an established amount that the licensee or -- or in this

case, Sandvine would pay at the execution of the license.

Q. So how many patents are at issue in this case?

A. There are three patents at issue in this case.

Q. And how many claims from each of these three patents are there at issue in this case?

A. There are four claims.

Q. And do your opinions on damages change whether the jury finds infringement on one or all four of these -- of -- of the asserted claims?

A. They do not.

Q. Okay. And why do your opinions not change whether one or two or three or four claims are found to infringe?

A. It's my understanding that the -- that the claims themselves -- or each claim covers the entirety of the -- of the accused products, such that if even one claim infringed, it -- it encompasses everything.

MR. DAVIS: And, Your Honor, at this time I'd like to tender Mr. Bergman as an expert in economics and patent valuation damages.

THE COURT: Is there objection from the Defendant?

MR. KEAN: No objection, Your Honor.

THE COURT: All right. The Court will

recognize the witness as an expert in the designated fields.

Proceed, Counsel.

Q. (By Mr. Davis) How do you go about determining damages in a case such as this one?

A. The law sets the guidance for how to determine damages in a case like this. And what the law states is that upon finding for the claimant, the Court shall award the claimant damages adequate to compensate for infringement but in no event less than a reasonable royalty for the use made of the invention by the infringer.

Q. I notice you got "for the use made of the invention by the infringer" underlined, why are you underlining this in this slide?

A. Because I think it's a key part of the law which basically says that you have to look at how the infringer is using the product and the benefit that the infringer is getting from its use of the product in order to determine a reasonable royalty.

Q. Now, you mentioned a reasonable royalty. What is a royalty?

A. A royalty is the payment for use of somebody's property. So if you had a company that wanted to take timber off your land, that -- that company would need to

pay you a royalty to do so.

Q. Is Packet Intelligence entitled to a reasonable royalty in this case?

A. Yes, it is.

Q. And how did you determine what that reasonable royalty should be?

A. I looked to the law and used in this case what's called a hypothetical negotiation to determine a reasonable royalty.

Q. And what is a hypothetical negotiation?

A. So a hypothetical negotiation, it -- it imagines that the infringer and the patentholder would have sat at a table prior to the date of first infringement and would have negotiated a license for the patents.

Q. How is a hypothetical negotiation different from a real-world negotiation?

A. There are a number of key distinctions between the hypothetical negotiation and a real-world negotiation that we're all used to.

The first key distinction is that in the hypothetical negotiation, the patents are assumed to be both valid and infringed. There's no question about them. Whereas in the real-world negotiation, there's always a question about them. You're not sure -- you're

not a hundred percent sure whether or not those patents have been -- are being infringed and are valid. So it's a big distinction.

Q. Why does the law require the parties to make this assumption of infringement and validity?

A. It's primarily to make sure that the -- the -- the negotiating companies are on equal footing, that you are determining the fair value of those patents.

Q. Now, what other things are assumed or used in the hypothetical negotiation that are not used in a real-world negotiation?

A. Another big distinction is that the parties to the negotiation, they know all the relevant information, right. It's like playing poker with your -- with your -- with your cards face up. Everybody knows what's going on. You can't hide anything.

And that also includes information into the future. So it's almost like the -- the parties have a crystal ball, they know what's going to happen.

Unlike, obviously, a real-world information where people cannot tell you everything, they can hold their cards close to their chest.

Q. And so in the hypothetical negotiation occurring between Sandvine and Packet Intelligence, what is one of the things that Packet Intelligence will know

about Sandvine using the book of wisdom or the cards face up?

A. So, for example, Packet Intelligence will know that Sandvine has generated $114 million worth of revenue for the accused product. They would know that at the hypothetical negotiation.

Q. Now, what does the hypothetical negotiation look like in this case, this particular case?

A. So in this case you would imagine a representative from Packet Intelligence sitting down at a table with a representative from Sandvine to negotiate for rights or a license to these individual patents back in June of 2006.

Q. Now, why do you assume that the negotiation occurred in June of 2006?

A. Because that's prior to the date of the first sale -- sale of the PTS 4000 which is the -- one of the accused products in this case.

Q. So that's the date of first infringement?

A. That's correct.

Q. What factors do you consider in determining the reasonable royalty amount that would be negotiated as part of this hypothetical negotiation?

A. So the courts have provided some guidance as to the factors that you should take into account when

determining a reasonable royalty. And -- and here is a list of those factors.

Q. Now, where will the jury get this list of factors to take into account in reaching their decision?

A. It's my understanding that Judge Gilstrap will provide these factors.

Q. Now, how do you use these factors to determine a royalty?

A. So what I do is I take these factors, and I break them up. And I put them into two traditional approaches for the valuation of an asset. And those two approaches are the income approach and the market approach. So all of those factors either fit within one or both of those categories.

Q. And would you please explain for the jury what those -- those two approaches are?

A. Sure. So I think the best way to do it is by way of an example. And the first approach that I'll discuss is the market approach because I think it's the one that's most relatable to -- to everyone, which is can I determine the value of one thing based on the value of another thing?

So is there something else out there in the market that I can look to to say that is comparable to what I'm trying to value, and, therefore, that can serve

as some guidance.

So to use the example of -- say you have a small business and you want to determine what the value of that small business is, you can look out to the market and say are there other small businesses that do what I do? And can I determine the value of my business based on the value of those businesses?

So that's a market approach.

Q. What about the income approach? Would you explain that, please?

A. Yeah, the income approach is more of an inward-looking-type approach which is based on the revenue and profitability of the company over time. So based on the series of cash flows that the company is generating over time, you can use that to say what's the value of this company. So one is sort of looking outward -- the market approach is looking outward, and the income approach is looking inward.

Q. Now, we're not evaluating businesses here. We're evaluating live patents and what a reasonable royalty license would be. Is there anything unique to patents that you take into account when you're evaluating the value of a patent under these approaches?

A. Yeah. So patents are -- are unique in that they can either be an incremental improvement or -- over

something that already exists, or it can be something that's more foundational.

So from my perspective, one of the first things that I always do when trying to determine the value of a patent is what are my alternatives to that -- to that patent? What is it improving over?

And so I think the best way to look at this is by way of an example.

If a company has a patent on a four-wheeled suitcase, okay? A four-wheeled suitcase never existed before, but a company has a patent on it, and I'm brought in to determine the value of that patent, the first thing I'd want to do is to look out and say, well, what alternatives to this four-wheeled patent exist in the market? And if I can find a -- let's see if I can make this work -- a two-wheel patent that's out there, the value of that four-wheel patent would be the benefit in going from a two-wheel patent or a two-wheeled suitcase to a four-wheeled suitcase, right? Because that's the incremental improvement that that patent is providing.

On the other hand, if I were to look out into the market and there are no two-wheeled suitcase, there are no wheeled suitcases at all, the only thing that's available to me are just plain old suitcases, that is a

drastically different value to that patent because the only alternative is a suitcase without wheels.

So that's a fundamental analysis that needs to happen in evaluation of any patent is what alternatives are out in the market.

Q. Now, in reviewing the evidence in this case, did you find any evidence that indicated the importance of these patents?

A. I did.

Q. And what did you find?

A. First, the -- the number of forward citations for these patents.

Q. And what are forward citations?

A. Forward citations -- I think we've heard a lot about this -- but forward citations are patents that have been cited that reference the patents in this case.

Q. And how do -- how can forward citations indicate -- indicate value?

A. Well, I think they can demonstrate an overall importance to the technology, and I think that the research has shown that the -- that the number of forward citations, sort of the -- the larger the perceived value of those patents. So the market will see the number of citations there and think that if there's a large number of citations, these -- these are

important patents.

And I think proof of that was -- is the -- is the -- is Packet Intelligence actually looked at forward citations when they acquired these patents. So to them, it was an indicator of value, and I think that's consistent with how people view these.

Q. Who were some of the companies that cited -- that were -- that cited back to patent -- Packet Intelligence's patents as forward citers?

A. Well, just looking at the '725 patent, it was cited 175 times. Companies who had patents that were cited include Intel, Amazon, Microsoft, fairly large companies in this space. And I think as we've heard, Sandvine also cited this particular patent, as well.

Q. At what point in time did you calculate the number of forward citations?

A. I believe I calculated this -- I want to say September of this year.

And then also, just to kind of show what the forward citations look like in context, because there's been a lot of discussion about this.

So these are all the patents that have been cited -- that have cited the '725 patent. So the next couple of slides here show -- and I think here on the second slide, right there, is Sandvine. Let me kind of

move forward. So those are all the forward citations for the '725 patent.

The '751 patent has been cited 62 times. So companies that have patents that have been cited include other major companies like Oracle, Microsoft, Cisco.

And then looking at the '789 patent, it's been cited 52 times. And companies who have had their patent cited include Microsoft, Intel, Google -- again, major companies in this particular space.

Q. Do you have any understanding of the technical benefits -- excuse me, technical benefits of the patents provided -- that are provided by the patents?

A. Yeah. So it's my understanding that the technical benefits of this case include better traffic classification, increased network security, and increased quality of service.

Q. And what information did you use to base your understanding of the technical benefits of the patents to Sandvine?

A. I got that through discussions with Dr. Almeroth and then saw Mr. Almeroth -- or Dr. Almeroth's testimony yesterday where he went through these in -- in detail.

Q. So would you briefly remind the jury what traffic classification is?

A. Yeah. So my understanding of traffic classification, as a non-technical expert, is -- it's really the ability to sort of look inside data packets, understand what's in there, and categorize that information.

Q. And what about traffic classification rates? Is that important -- I'm sorry, strike that.

What approaches did you use to determine what a reasonable royalty is in this case?

A. I used two separate approaches. I used both the market approach and the income approach that we -- that we discussed earlier.

Q. Okay. And how did you use the market approach to evaluate the amount that Sandvine should pay in the hypothetical negotiation?

A. So if you remember the market approach is looking to other agreements that exist out in the market and using those to determine some kind of comparability for the -- the patents in this case. And so for this case, I used the Cisco agreement as a comparable license.

MR. DAVIS: And, Your Honor, at this time, we're going to be going into the details of the Cisco agreement and would request that the courtroom be sealed.

THE COURT: All right. Based on counsel's request to protect confidential and proprietary information, the Court will order the courtroom sealed at this time, which means if you're present in the courtroom and you're not subject to the protective order that's been entered in this case, then you should excuse yourselves and remain outside the courtroom until it is reopened and unsealed.

(Courtroom sealed.)

(Testimony filed under seal by order of the Court.)

(Courtroom unsealed.)

THE COURT: For the record, we are unsealed.

Mr. Davis, you may continue with your examination.

MR. DAVIS: Thank you, Your Honor.

Q. (By Mr. Davis) I believe, Mr. Bergman, before we took the brief break, you were about to explain the other valuation that you performed in this case.

A. Yes, sir.

Q. Can you please explain what the income approach is?

A. Yes.

MR. DAVIS: Oh, can we get the slides,

please?

THE WITNESS: Thank you.

MR. DAVIS: Thank you.

A. So if you remember, the income approach was a way to do a valuation based on the amount of revenue or profit that's being generated. And so the example we used before was a -- based on a small company. And -- and in a patent case, it's especially important, as we talked about, to talk about the value over alternative technologies, what else is available into the market.

So that's the summary of the income approach.

Q. (By Mr. Davis) And what was your conclusions on the amount of reasonable royalty damages under the income approach?

A. Under the income approach, it's my opinion that a lump-sum payment of $13.49 million would be reasonable.

Q. And what methodology did you use to arrive at that number under the income approach?

A. So that methodology entails starting with the revenue of the accused products and then effectively giving Sandvine credit for all of its costs and contributions until we are at the end, left with the value that's directly attributable to the patents

themselves.

Q. And what is the first step in this analysis?

A. The first step is a determination of the accused product revenue.

Q. And what is the -- what are the accused products?

A. So the accused products, as I'm sure we all know at this point, are the PTS series of products, so the PTS 14000, the PTS 22000, the PTS 24000, the PTS 32000, and the PTS Virtual Series.

Q. And are these products important to Sandvine's business?

A. Yeah. In a document in -- in a public financial statement that Sandvine provides to its investors, Sandvine stated that the core of Sandvine's hardware platform is the Policy Traffic Switch or the PTS, the products that we've been discussing.

Q. Now, how did you go about determining what the revenue for the accused products was?

A. So I looked at the product revenue from -- or Sandvine's own financial documents which provided the accused product revenue from 2010 until 2016, and then estimated the total product revenue for the 2017 time period. And that total profit was 144 -- or, sorry, total revenue was $114 million.

Q. Where does this data come from?
A. This comes from Sandvine's own financial data --
Q. Okay.
A. -- that they provided in this case.
Q. And is that PTX-367?
A. Yes, it is. Thank you.
Q. Do the revenue figures on this slide include financial information for any products that are not at issue in this lawsuit?
A. It does not.
Q. Okay. So what's the next step in your analysis now that we have the total revenue for the accused products?
A. The next step is to give Sandvine credit for its direct costs, the costs that are directly attributable to the production of these devices.
Q. And how did you do this?
A. Again, I looked to Sandvine's own financial documents over the relevant time period. And based on that, Sandvine's direct costs for these products is 29.84 million. So I deducted that amount from total revenue.
Q. And based on this analysis, how much was allocated to direct costs?

A. 26.1 percent or 29.8 million.
Q. And the result was?
A. That Sandvine has a gross profit of $84.6 million.
Q. Okay. And what's the next step?
A. So the next step is realizing that part of that profit is due to both the hardware and -- or the profit itself is due to both the hardware and the software of the device. And because it's my understanding that the -- the software is what primarily embodies the patented technology and -- and because I have to give value to all the things that Sandvine does that -- that isn't a part of the patented technology, I have to give credit to Sandvine for the profit associated with the hardware.
Q. And so how did you determine the profit associated with hardware?
A. So I looked at Sandvine's own documents to try to determine the value of the hardware, and I found testimony from Mr. Don Bowman, who is the CTO, and how he described the -- the difference between hardware and software and how it's evolving over time.
And one of the things that Mr. Bowman stated is that they're anticipating a time in the future when there's no hardware sold at all. So they're getting to

a point where it's the software that is the key component, and that hardware is more like a commodity. And in another part of his deposition, when they're discussing the virtualization software, which is software that doesn't require hardware to run, that's the PTS Virtual Series products that's part of this case, he stated that we looked at the cost it would take them -- who's their customers -- to deploy our software on commodity servers from Dell or HP, and we looked to make sure so that we would achieve a similar net value as buying our hardware.

So they looked at Dell and HP as alternatives to their hardware. So based on that information, I used Dell and HP -- because they have publicly available information, I used Dell and HP to make a determination as to the amount of profit that should be allocated to the hardware.

Q. So you used the amount that Dell and HP -- the amount of profit that Dell and HP make on their hardware as a proxy for the amount of profit that Sandvine makes on its hardware?

A. That's right.

Q. Okay. And how did you apply this data in your analysis?

A. So looking at Dell and HP's own financial

information and the amount of gross margin that they received, the amount of profit they received from selling their hardware, I determined that taking the two companies combined over the relevant period, that 20.7 percent was related to hardware. So I applied that 20.7 percent and gave credit to Sandvine for $7.8 million.

Q. And is that what you're showing in this -- this slide here?

A. That's correct.

Q. Okay. What is the next step in your analysis?

A. The next step in the analysis is to give Sandvine credit for its indirect costs, so those costs that aren't directly attributable to the production of the devices.

Q. Why was this an important or necessary part of your analysis?

A. Because I recognized that the functions provided by sales and marketing, for example, help to generate the revenue that's associated with these accused products.

So while they can create the product, they need to advertise it, they need to go out there and sell them to their customers. So there -- there's benefit to the revenue from these particular functions. So I went

about giving credit to Sandvine for those functions.

Q. And how did you go about determining the appropriate amount to give credit to Sandvine for sales, marketing, and operating expenses?

A. Again, I looked to Sandvine's own financial information and looked at the amount that they spent on sales and marketing and general admin -- general and administrative expenses over relevant time period and found that on average, 39.7 percent of their revenue is spent on these indirect costs.

Q. And did you apply that 39.7 percent in your analysis?

A. I did.

Q. And where -- where did you do that?

A. Right here. So of the 114.4 million in revenue, I credited to Sandvine 45.4 million for their indirect costs.

Q. Okay. And you're not done yet. What -- what's the next step of your analysis?

A. So after we've made those allocations, what we're left with is the value of the software itself. We've taken out direct costs, we've taken out indirect costs, and we've given some -- some portion of the profit back to the hardware. So now we've gotten to the base software where the patents live.

Q. And -- and show us on the -- on your slide here where the value of the base software here.

A. (Indicating.) Right here.

Q. Okay. And why do you need to make an -- an allocation for -- well, strike that.

What did you do next after determining the value of the base software?

A. So, again, the goal is to get to the patents, right, how much of this is -- how much of this profit is being generated by the patents themselves.

So the next step is to recognize that -- that there are features and functionality within the software where the patents live and where the patents don't live and to give credit to Sandvine for those areas that are non-infringing essentially.

And so because we know that the patents are part of traffic classification as a whole, the next step was to determine the proper allocation to traffic classification.

Q. And how did you go about doing that?

A. So I looked at Sandvine's own documents to describe -- to see how they described traffic classification and how important they see traffic classification as a good indicator of value.

Q. Well, what document is this?

A. This is PTX-344. And in this document, Sandvine describes traffic classification as the foundation of policy control and business intelligence. And if you remember, policy control is one of the main functionalities that's part of the PTS. PTS is a Policy Traffic Switch. So policy control is built on top of traffic classification.

And as you can see here, you can't manage what you can't measure. So you can't provide policy control if you're not properly classifying traffic.

Q. Did you find any other evidence?

A. Yes. So another Sandvine document, PTX-363, describes very similar language where it says accurate traffic identification and insight measurements form the foundation of network business intelligence and network policy control.

And it goes on to say that without identifying and measuring the traffic flowing on their networks, CSPs, which are content service providers, these are effectively Sandvine's customers, customers like Comcast, Time Warner, that those customers can't craft new subscriber services to their customers and that they can't ensure correct billing.

So traffic classification enables policy control, that policy control enables their customers to

create new services. So if you're not classifying traffic properly, your customers can't create new product.

Q. Is there any more evidence you relied on?

A. One more piece.

Q. Okay.

A. So this document talks about -- says that the -- and this is -- I don't have a PTX number on this one.

So this one says that the top priority when implementing traffic recognition is accuracy. And that not being accurate can be devastating when management policies are put in place.

So, again, another indicator as to the value of traffic classification.

Q. So based on your review of this evidence from Sandvine's documents, what did you conclude with respect to the value of the traffic classification to the base software?

A. So given the fact that traffic classification is the foundation of their policy control, and policy control is effectively what they're selling, I give traffic classification as a whole a 50-percent allocation to the entire base software.

Q. Now, how did you arrive at the 50-percent

value?

A. So when we get to this level of analysis, there -- there are really no hard numbers to be able to point to. Sandvine itself doesn't quantify the value of traffic classification in its financial statements. So at this point, we have to use a reasonable estimation. And based on all the documents that I've seen, and there are a lot of other documents that are very similar in nature to this, given the fact that it's foundational to their system, it's -- it's a reasonable assumption.

Q. Since it's foundational, could you have gone higher?

A. I could have gone higher.

Q. Okay. What was the next step in your -- in your income -- incremental benefit approach?

A. Okay. So now we've gotten to the point where we are really close to the technology that represents the patents, we've gotten all the way down to traffic classification, now I have to figure out what portion of traffic classification is -- or what portion of the profit that's attributable to traffic classification is represented by the patents themselves.

Q. And how did you do this?

A. Well, if you remember from our discussion with the suitcase example, the way to determine the value of

a patent is to find out what the alternatives are in the market.

So I looked at two different things. The first is, as I just described, look at what the value is over the prior art.

The second is to see what the value of this technology is to other Sandvine products that are not just PTS products but Sandvine sells a lot of other things, too, so is there value to their patent outside of Sandvine's own -- outside of the products that are at issue in this case?

Q. Okay. So starting with the first one, what prior art -- the value of the prior art, what is the prior art that you are comparing to to determine the additional value or benefit to the patented technology?

A. So it's my understanding that the prior art in this case is what's called the well-known port methodology.

Q. And what is your basis for your understanding that the prior art is the well-known port technology?

A. Based on my discussions with Dr. Almeroth.

Q. And how did you determine the value of the patented technology over the well-known port technology?

A. So I did a couple of things. One is I looked at the val -- at what -- how well well-known port

methodology performs, compare that to how well Sandvine performs. And in -- in conjunction with discussions with Dr. Almeroth determined an overall value.

Q. And what did -- what did the evidence that you looked at tell you?

A. So, first, I looked at the performance of well-known port methodology as a whole to -- as -- to start as a baseline.

And looking at the academic literature with regard to well-known ports, I found two documents here.

The first describes the well-known port methodology, and essentially says that 30 percent of the traffic cannot be attributed to a particular application. So effectively, at best, this methodology can only characterize 70 percent of the traffic.

Q. How did you use this evidence?

A. So I looked at a separate piece of evidence, a separate academic study that did a similar type analysis and came to a similar conclusion, where it showed that port-based analysis is unable to identify 30 to 70 percent of Internet traffic. So it's only able to identify 70 to 30 percent, basically, so using that as sort of the benchmark to understand what the prior art technology -- how that performs.

And, again, we saw this document yesterday

that talks about various recognition techniques. This is a Sandvine document, it's PTX-344, that talks about using the port number to classify traffic.

And effectively, Sandvine's own documents state that you should never use this. It's not an appropriate methodology to characterize traffic.

But in this situation, because there are no non-infringing alternatives, as we heard from Dr. Almeroth yesterday, we fall back to the prior art technology.

Q. And just to make sure I understand you, you're saying that this document here is talking about the prior art well-known port technology?

A. That's correct.

Q. Okay. So I got ahead of -- well, based on the three pieces of evidence you've just shown us, the two documents and this document, you then -- what did you do next?

A. So then I took a look at how well is Sandvine performing? How is its traffic recognition?

Q. What did you find with respect to how Sandvine performs on traffic recognition?

A. So I found this Sandvine document, which is PTX-363, which stated that Sandvine routinely sees traffic recognition rates upward of 95 percent. So

compared to the prior art technology, which was at best 70 percent.

Q. And so how did you then use the percentages of the prior art versus the percentages of Sandvine to do a comparison?

A. I did find one other document.

Q. Oh, excuse me.

A. It's okay. Which described that best of breed solutions should recognize at least 90 percent of traffic. So, again, another verification that 90 to 95 percent is where traffic recognition rates from Sandvine are typically seen.

Q. And so now my -- my prior question, how did you -- how did you compare the success rates of Sandvine's products versus the -- the prior art methodology?

A. So based on all of that, we know that Sandvine's traffic -- traffic recognition rates are 25 percent to 65 percent higher than the prior art systems.

Q. How -- how did this -- how -- how did these percentages factor into your analysis?

A. So it was a key part of my analysis. But there's a second part of the analysis -- oh, sorry, I also had a discussion with Dr. Almeroth about this and talked about, well, we know -- if we know that the prior

art technology is at -- at best 70 percent and Sandvine is recognizing 95 percent, based on his expertise, what portion of that is due to the patented technology? And Dr. Al told me -- Dr. Almeroth told me that the vast majority of the increase over the prior art systems is due to the patented technology.

Q. Okay. What did you do next?

A. So the next step was to look at the value to other Sandvine products, besides the accused products, that were benefitting from the patented technology.

Q. Why is it important to look at the value to other Sandvine products to determine the benefit that Sandvine is deriving from the patented technology?

A. Well, if you remember, we're -- we're -- we're talking about a hypothetical negotiation here, and we're talking about one where both parties know everything. So while there are accused products in this case that are clearly benefitting from the patented technology, the parties would recognize that there are other products out there that maybe rely on those products -- on the -- the accused products to operate, to function. And so there's sort of a downstream benefit that occurs from that, and that would be taken into account in the hypothetical negotiation.

Q. So in looking into other Sandvine products

that benefit from the patented technology, what did you find?

A. So I found that there were a number of products that did benefit and talked to Dr. Almeroth about this.

And the first thing I did was to kind of get a feel for how important those products are to Sandvine's business as a whole.

And so this is a list of all the products that would benefit from the patented technology. And based on Sandvine's own financial information, those accused products have generated over a hundred million dollars in revenue over the relevant time period.

Q. What evidence did you find that these products benefitted from the patented technology?

A. Well, there's a lot of products here, so I'm going to focus on really the top three and -- and provide evidence for the top three.

The first is -- is service revenue. And a Sandvine document described the professional services and -- and the maintenance that are -- are part of the acquisition of a PTS product. And what Sandvine stated is that in all but infrequent situations, the customer will purchase maintenance with all new hardware and software deliveries.

So because we know that these patents are important to traffic classification and traffic classification is foundational to the products, these -- this service revenue is being generated by the assistance of the patented technology.

Q. What else did you look at?

A. So the second product that was on that list was a product called traffic management. And so I looked at Sandvine's documents and how Sandvine described those documents. And one of the documents that I found, and I found a number of documents, but one of the documents I found was PTX-337 that stated that stateful inspection -- which I understand to be sort of a synonym for traffic classification -- is key for both accuracy and transparent traffic management options, so tying back accuracy and traffic classification with the traffic management solution.

MR. DAVIS: If you could, can you go back to your list of products? Thank you.

Q. (By Mr. Davis) So we've -- we've just talked about service revenue and traffic management. You mentioned you were just going to talk about the first three. What -- what did you find with respect to usage management?

A. So with regard to usage management, again, I

looked at Sandvine's own documents to see how -- how they described usage management. And there is a product overview document that describes usage management. And in that document, they describe the accuracy component of usage management and how that's directly tied to its leading traffic classification functionality.

Q. Now, did you speak with Dr. Almeroth regarding these products?

A. I did.

Q. And what did he tell you?

A. Dr. Almeroth told me that based on his analysis of these products, without the patents, that these products would be severely degraded.

Q. So what was your conclusion based on all of this evidence and analysis with respect to the value of additional revenue that's related to the patented technology?

A. So given the fact that Dr. Almeroth states that the vast majority of the increase over the prior art is based on the patented technology, as well as the fact that the additional Sandvine products would be severely degraded without the use of the patented technology, I determined that it's reasonable to assume that 50 percent of traffic classification is due to the patented technology.

Q. Now, as a result of all these allocations, what is your conclusion?

A. So after starting with revenue, giving credit to Sandvine for its direct costs, indirect costs, profit on the hardware, non-infringing base software features, I determined that $7.9 million between 2010 and 2017 was attributable to the patented technology.

Q. Now, this is -- you mentioned that this is only between the date of first infringement in 2010 and the date of trial.

Did you determine what the amount would be if the analysis was extended out through the life of the patents when the patents expire?

A. Yeah. So this demonstrative shows that what we've done up until this point is really to determine the amount that's directly attributable to the patents up until today.

So the 7.85 million is until November of 2017, but what we're trying to do is determine what the total amount would be if we extend it all the way out to June 2022.

And so using the information that we have over that seven-year period and assuming that there's a steady state of -- of growth for the next five years, we can project out over that time period and recognize that

an additional 5.64 million would be directly attributable to the patents over that next five-year time period.

Q. And what happens after June of 20 -- of 2022?

A. The patents would expire.

Q. And then what happen -- would Sandvine have to pay any royalty for that period?

A. They do not.

Q. They could use them for free?

A. Yes, sir.

Q. How does the income approach that you just walked us through compare to the market approach that you discussed at the beginning of your testimony?

A. So taking into account the 7.85 million up to trial and then including the 5.64 million post-trial gets us to a total amount over the life of the patents at 13.49 million.

If we compare that to the market approach using the Cisco agreement, it's 13.89 million.

Q. What does -- what do the similarities of these two numbers tell you?

A. It gives me a lot of comfort that the analyses are correct because both methodologies are approaching the value of these patents from completely different avenues.

One is looking at Sandvine's revenue and profitability directly attributable to these patents. The other is taking into account an agreement that was entered into by a separate party, and so there's no overlapping evidence, yet they come to a -- a pretty close number at the end of the day.

Q. Now, did you find any evidence that Packet Intelligence had a licensing policy?

A. I did.

Q. What -- what evidence did you find?

A. According to the testimony of Mr. Brunell, Mr. Brunell stated that Packet Intelligence was unwilling to enter into a licensing agreement that was -- that would be less than 2.5 percent of revenue.

Q. And Mr. Brunell didn't testify at trial. Where does that testimony come from?

A. From his deposition.

Q. Okay. And is that important at all, or does that factor into your analysis?

A. It does.

Q. How so?

A. It factors into the analysis such that when I'm looking at a -- a comparable license, for example, and I'm trying to figure out what the implied rate from that comparable license would be, if I came out to

something that was less than two and a half percent, I'd really want to think about whether or not that makes sense in the context of this -- in -- in the context of a hypothetical negotiation.

Q. Now, at the beginning of your testimony, we discussed the various factors that the law requires you or -- to at least take into account in determining a reasonable royalty. As part of your overall investigation and analysis, did you analyze and consider each and every one of those factors?

A. Yes. So if you remember at the beginning, we talked about the various factors that Judge Gilstrap will -- will provide you that -- to take into account, and I think it's really good to sort of reframe this now that we've gone through this entire discussion.

And, you know, when I was a kid and you did -- and you did math problems, one of the things your math teacher would always say is make sure you check your work, make sure that the number that you get makes sense.

And I think what -- what is important is that based on my understanding of the tech -- technological benefits of this case, the fact that traffic classification is extremely important to Sandvine, that Dr. Almeroth has concluded that there -- that there are

no non-infringing alternatives in this case, and that Sandvine has -- has not offered its own alternative to infringement in this case, and that the fact that the vast majority of the benefits according to Dr. Almeroth are due to the patented technology, that taken into account all those factors gives me comfort that the analysis that I performed is correct.

Q. And so based on this analysis, what are your conclusions as to a reasonable royalty?

A. So in summary, based on the Cisco agreement, it's my conclusion that a 13,890,000-dollar royalty, lump-sum royalty is appropriate, and based on the income approach, a 13,490,000-dollar lump-sum royalty is reasonable.

Q. Thank you, Mr. Bergman.

MR. DAVIS: Your Honor, I pass the witness.

THE COURT: All right. Cross-examination by the Defendants.

Mr. Kean, you may proceed when you're ready.

MR. KEAN: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. KEAN:

Q. Good morning, Mr. Bergman.

A. Good morning, Mr. Kean.
Q. Nice to see you again.
A. Good to see you, as well.
Q. Mr. Bergman, in your direct testimony, you stated that Packet Intelligence would be entitled to a reasonable royalty. Do you remember that?
A. I do.
Q. Okay. Now, if the jury finds that there's no infringement in that case, that statement is not true; is that right?
A. I believe that's correct.
Q. So, in other words, if the jury finds no infringement in this case, Packet Intelligence is not entitled to a reasonable royalty; is that right?
A. I -- I believe that's correct, yes.
Q. Now, Mr. Bergman in your direct examination, you mentioned forward citations in the patents, do you recall that?
A. I do.
Q. Okay. Do you know the average number of forward citations for patents that are related to the technology that the patents in this case involve?
A. I do not.
Q. Now, Mr. Bergman, do you agree that the parties to a hypothetical negotiation in this case would

have considered 3 percent to be a reasonable royalty?
A. I do applied to a certain revenue base.
Q. Now, Mr. Bergman, let me ask you again, do you agree that the parties to the hypothetical negotiation in this case would have considered 3 percent to be a reasonable royalty?
A. I do, but I have an explanation, if you want it.
Q. Now, Mr. Bergman, you provided an expert report back in the summer, do you remember that?
A. I do.
Q. And in your expert report, that outlined the opinions that you intended to offer in this case, do you remember that?
A. Yes, sir.
Q. Did you write that report?
A. I did.
Q. Now, in your expert report, you stated, quote: It is my opinion that a comparable license between Sandvine and Packet Intelligence would be $6,591,354.00 from February of 2010 to trial based on a reasonable royalty of 3 percent.
Do you remember that?
A. Yes, sir.
Q. That was your opinion of this summary, wasn't

it?
A. Yes, it was.
Q. Did you see Mr. Skiermont's opening yesterday?
A. I did.
Q. Okay.
MR. KEAN: Mr. Palisoul, would you please put Slide 15 up?
Q. (By Mr. Kean) Now, Mr. Bergman, did you see Mr. Skiermont present this slide yesterday during his opening statement?
A. Yes, I did.
Q. Okay. Now, this number here says infringing revenue of $196 million -- $196.5 million, do you see that?
A. Yes.
Q. Now, the bottom of the slide, if -- if we zoom out, I believe it cites to your opinions, do you see that?
A. Yes.
Q. Mr. Skiermont said yesterday, and I believe you testified earlier today, that the revenue for the accused products is $114.4 million; is that right?
A. Through trial.
Q. Okay. And so we're -- what's the reason for the difference between this $196 million and the $114

million?

A. The $196 million is if you project revenue out through the life of the patent.

Q. I see.

Now, in your direct testimony, you also mentioned the book of wisdom, do you recall that?

A. Yes, sir.

Q. Okay. Now, the book of wisdom allows you to take the hypothetical negotiation in 2006 and look forward to present time; is that right?

A. That's correct.

Q. Now, that doesn't allow you to look into the future; is that right?

A. It allows you to take into account future events.

Q. Sure, but future events that have actually happened, would you agree?

A. It definitely allows you to take into account future events that have already happened.

Q. Okay. So going back to the slide, the pie chart, there's about $80 million difference between the $114 million in actual revenue for the actual accused products and the $196 million presented in Mr. Skiermont's slide; is that right?

A. That sounds right.

Q. Now, did this projection come from your analysis?
A. Yes, sir.
Q. And you assumed an 11-percent compound annual growth rate based on Sandvine's past data; isn't that right?
A. I did, but I also offset that by the risk of those cash flows into the future, and I offset that by 11 percent, as well. So in effect, it's kind of a flat amount going forward.
Q. Okay. But you -- you assumed an 11-percent compound growth rate, did you not?
A. Yes.
Q. And this is not based on projection information that Sandvine gave to you; is that right?
A. That's correct.
Q. And this is not based on projection information from any industry analysis; is that right?
A. It's based on Sandvine's historical performance.
Q. Okay. Let's look at Sandvine's historical performance.
MR. KEAN: Mr. Palisoul, will you bring up Slide 60, please, in Mr. Bergman's demonstratives?
Q. (By Mr. Kean) So down at the bottom here, we

have the total revenue for the accused products, do you see that Mr. Bergman?

A. I do.

Q. And looking at that total revenue, that didn't increase by 11 percent each year, did it?

A. No, it's a -- it's a -- it's a compound average growth rate.

Q. Okay. So, in fact, if you look at this revenue here in 2010 to 2011, for instance, down at the bottom, the revenue actually went down, didn't it?

A. Yes.

Q. And, again, in 2011 to 2012, the revenue went down again, didn't it?

A. It did.

Q. And, again, in 2014 to 2015, the revenue went down, didn't it?

A. It did.

MR. KEAN: Now, Mr. Palisoul, if you would remove this highlighting, please? And let's focus on the 11.8 at the bottom of 2010 and, also, the 16.8 at the bottom of 2017.

Q. (By Mr. Kean) So, Mr. Bergman, the revenue for the accused products in 2010 was $11.8 million based on your demonstrative here; is that right?

A. That's correct.

Q. Okay. And the revenue for the accused products was $16.8 million in 2016; is that right?
A. That's correct.
Q. Now, if you find the compound annual growth rate between 2010 and 2016, that would actually be somewhere less than 6 percent, not 11 percent; isn't that right, sir?
A. Based on the math, yeah.
Q. So if we look at Sandvine's actual past data, it would be a growth rate of less than 6 percent; isn't that right?
A. Over that time period, which I don't believe is the appropriate time period, but over that time period, yes.
Q. Now, if you applied a royalty rate or a projected compound annual growth rate of less than 6 percent, that total number would be a lot less than the one that Mr. Skiermont presented in his slide; isn't that right?
A. Based on the math, yes.
Q. And the reality is you can't predict the future any better than I can; isn't that right, Mr. Bergman?
A. I can look at past performance as a predictor of the future. That's what economists typically do.

Q. Sure. And the past performance here shows a growth rate of less than 6 percent; isn't that right?
A. Over that period -- again, I think that's the inappropriate period to look at.
Q. Now, Mr. Bergman, in your expert report, you analyzed an acquisition between Exar and Hi/Fn; is that right?
A. That's correct.
Q. And could you remind the jury, who are Exar and Hi/Fn?
A. Hi/Fn was a company that owned the patents up until 2009, and then that company was acquired by Exar in 2009 for, I believe, $59 million.
Q. Now, in your report, you analyze a valuation that was provided by an accounting firm named Duff & Phelps. Do you recall that?
A. I do.
Q. And you agree that that valuation that was provided by Duff & Phelps is a comparable for the circumstances of this case; is that right?
A. With adjustments, yes.
Q. Now, Duff & Phelps determined that a 2 percent royalty rate would be appropriate in that circumstance; isn't that right?
A. For the circumstance in which it was applying

it, yes.

Q. Yeah, so in this comparable agreement that we have, the Exar and Hi/Fn acquisition, Duff & Phelps determined that it was actually a 2 percent royalty rate that applied there; isn't that right?

A. Applied to Hi/Fn's products for that market, yes.

Q. Now, that 2 percent royalty included the three patents that are asserted in this case, did it not?

A. That's correct.

Q. That 2 percent royalty actually included a lot of other things, too; is that right?

A. It included some other patents, yes.

Q. Well, it also included core technology; isn't that true?

A. I don't believe so.

Q. You don't think that the Duff & Phelps report included core technology in their analysis of the Exar-Hi/Fn agreement, Mr. Bergman?

A. I don't, and I can explain why.

Q. Mr. Bergman, just a minute ago, I was asking you about the expert report that you provided this summer. Do you remember that?

A. I do.

Q. Okay. And in your expert report that you

provided this summer, at Paragraph 155, you say, quote, Duff & Phelps ultimately determined that a royalty rate of 2 percent represented a reasonable royalty rate that a user would pay for the patents/core technology of Hi/Fn, end quote.

Do you recall that?

A. I do.

Q. That's what you said, right?

A. Quoting somebody else, yes.

Q. Okay. Now, there were more than just the three patents asserted in this case involved in that Exar-Hi/Fn deal; is that right?

A. That's correct.

Q. In fact, there were 43 patents that were included in that agreement, right?

A. I believe that's right.

Q. And that 2 percent rate included all 43 patents; isn't that right?

A. It's a little complicated, but, yes.

Q. Now, Packet Intelligence doesn't own all of those 43 patents, do they?

A. They do not.

Q. In fact, Packet Intelligence only acquired 26 of the 43 patents that Exar bought from Hi/Fn; isn't that right?

A. I believe that's correct.
Q. And of the 26 that Packet Intelligence bought, only three are asserted in this case; isn't that right?
A. Three are asserted in this case, that's correct.
Q. Now, Mr. Bergman, you testified about the Cisco settlement agreement. Do you recall that?
A. I do.
Q. Now, that settlement agreement arose in the context of litigation; isn't that right?
A. Yes, sir.
Q. It was a settlement agreement that resolved a lawsuit between Packet Intelligence and Cisco, right?
A. That's correct.
Q. That Cisco settlement, that was never presented to or decided by a jury, right?
A. It was not.
Q. You don't know the reasons that led to that Cisco settlement, do you?
A. I've had discussions with Packet Intelligence about it, but don't know all the reasons, no.
Q. You didn't speak with anyone at Cisco who is familiar with that settlement agreement, did you?
A. I did not.
Q. You personally don't know what Cisco would

have thought at the time; isn't that right?
A. I know based on the amount that they paid what they thought.
Q. Mr. Bergman, you personally do not know what Cisco would have thought at the time of the settlement agreement with Packet Intelligence; isn't that right?
A. Could you be a little clearer? Thought about what?
Q. Thought about the settlement agreement.
A. I think having an understanding of the total amount that they paid gives me some indication as to what they thought.
Q. Mr. Bergman, you recall your deposition in this case?
A. Generally, yes.
Q. So back in the summer, I -- I think came down to Dallas and took your deposition. Do you remember that?
A. I do.
Q. And that testimony that you provided that day was under oath, right?
A. It was.
Q. Turning to your transcript, the Bergman transcript at 137, Lines 16 through 18.
MR. DAVIS: I'm sorry, Your Honor, which

-- which transcript -- can I have --

MR. KEAN: Thank you. It's the first transcript.

Q. (By Mr. Kean) And just for clarity, Mr. Bergman, there were two depositions in this case, right?

A. There were.

Q. Okay. So I'm going to refer to your first deposition.

A. Okay.

Q. And in that first deposition, I asked you: You personally do not know what Cisco would have thought at the time, right?

And you said: I do not.

That was your testimony, wasn't it, sir?

A. Can I see the context of the question before?

Q. Sure.

MR. KEAN: Mr. Palisoul, will you present that?

A. So I think my answer to that question was in relation to your asking me what I thought -- or what Cisco would have thought about the overall probability of judgment. And so based on that question, I don't know what Cisco believed the probability of judgment to be.

Q. (By Mr. Kean) Now, on direct, you were

presenting a contrast between the Cisco settlement agreement and the hypothetical negotiation in this case.

And you were saying that in the Cisco settlement agreement, the parties there would contest validity and infringement. Do you recall that?

A. Yes.

Q. You don't have any reason to know whether or not Cisco would have contested invalidity or infringement, do you?

A. I did.

Q. You didn't talk to anyone at Cisco about that settlement agreement, did you?

A. No, but I read the settlement agreement.

Q. You didn't have access to confidential documents that were produced in the Cisco -- the Cisco case, did you?

A. I didn't.

Q. You didn't do any analysis of any of the accused products to determine potential infringement, did you?

A. I did look at the accused products and their relationship to Sandvine's products.

Q. Mr. Bergman, you didn't do an analysis of the accused products to determine potential infringement in the Cisco case, did you?

A. Not infringement, no.
Q. You didn't speak with any technical expert who had performed an infringement analysis of the Cisco products, did you?
A. I read the infringement contentions in that case. I'm not a hundred percent sure whether those were prepared by a technical expert or not.
Q. You didn't speak with any technical expert who had performed an infringement analysis, did you?
A. I did not speak with one, no.
MR. KEAN: Your Honor, I'd like to present one of the demonstrative exhibits that Mr. Bergman presented in direct, and I think it's going to get into some of the confidential information in the Cisco settlement, so I'd ask to seal the courtroom, please?
THE COURT: All right. I'll tell you what we're going to do. Before we go to that, we're going to take this opportunity to have a short recess. When we come back from recess, then I'll seal the courtroom, and you can proceed on that basis, Counsel.
MR. KEAN: Thank you, Your Honor.
THE COURT: Ladies and gentlemen of the jury, if you'll close your notebooks and just leave them in your chairs, follow all my instructions during this

recess, including not to discuss the case, and then we'll be back in here shortly to continue.

The jury is dismissed for jury at this time.

COURT SECURITY OFFICER: All rise for the jury.

(Jury out.)

THE COURT: All right. Be seated, please.

Counsel, prior to the trial, you submitted, as the Court directed, a joint proposed final jury charge and verdict form. The Court is persuaded, given the progress of the case, that a revised submission would be of benefit to the Court, and I'm directing that you meet and confer and jointly submit a revised version of your proposed final jury charge and verdict form for the Court's consideration and that you submit that electronically, not later than 10:00 p.m. this evening.

With that, we stand in recess for a short recess.

COURT SECURITY OFFICER: All rise.

(Recess.)

(Jury out.)

COURT SECURITY OFFICER: All rise.

THE COURT: Be seated, please.

All right. Mr. Kean, you may return to the podium.

MR. KEAN: Yes, and, Your Honor, if I may, I no longer am going to be presenting that slide, so sealing the courtroom is no longer necessary.

THE COURT: All right. Just so the jury's not confused, in light of where we stopped before the recess, I'll ask you if you want me to seal the courtroom, and then you can tell me you've determined that you're going to move in another direction, or whatever you want to say, so the jury will know why we're not doing it.

MR. KEAN: Very good. Thank you, Your Honor.

THE COURT: All right. Let's bring in the jury.

COURT SECURITY OFFICER: All rise for the jury.

(Jury in.)

THE COURT: Please be seated, ladies and gentlemen.

Mr. Kean, before we recessed, you indicated that you might ask the -- the Court to seal the courtroom, is that still your intention?

MR. KEAN: Your Honor, that's no longer necessary. I'm going to move in another direction.

Thank you very much.

THE COURT: All right. Then you may proceed with your cross-examination.

Q. (By Mr. Kean) Mr. Bergman, turning back to our discussion of the Cisco settlement, you don't know the royalty base for that agreement, do you?

A. I do not.

Q. And you were not able to determine a royalty rate based on that settlement agreement, were you?

A. I was not.

Q. Mr. Bergman, you don't know how many infringing products Cisco would have sold in the United States; is that right?

A. That's correct.

Q. And you don't know how many infringing products Cisco would have sold elsewhere outside of the United States?

A. I do not.

Q. And you don't know how much revenue Cisco would have made for selling infringing products in the United States; is that right?

A. That's correct.

Q. And similarly, you don't know how much revenue

Cisco would have made for selling infringing products outside the United States; is that right?

A. That's correct.

Q. How many times has Cisco been sued for patent infringement in the last 10 years?

A. I have no idea.

Q. You don't know how often Cisco settles those cases, do you?

A. I have no idea.

Q. You don't know how Cisco determines whether or not to settle those cases, do you?

A. No.

Q. Do you know whether Cisco was working with the inventors of the patents in this case on the MeterFlow project?

A. I don't know.

MR. KEAN: Mr. Palisoul, will you pull Slide 60, please, of Mr. Bergman's presentation?

Q. (By Mr. Kean) And so, again, here, Mr. Bergman, what we have here is your Slide 60, and this shows the total accused product revenue of $114.4 million, do you see that?

A. Yes, sir.

Q. Now, if we apply -- apply a rate of 3 percent, the rate that you said would be a royalty rate to this

accused product revenue, that result is $3.4 million; is that right?

A. I don't think I can answer that question.

Q. You can't tell me what the outcome would be if we apply a 3-percent rate to $114.4 million?

A. I can tell you what the math is. I don't agree with your characterization of my 3-percent rate.

Q. Okay. If we apply your 3-percent rate to the $114.4 million, the result of that math would be $3.4 million; isn't that right, sir?

A. No.

Q. You do not agree that if we multiply $114.4 million times 3 percent that the result would be $3.4 million?

A. That, I agree with.

Q. Okay. Well, let me ask it this way, then: Mr. Bergman, you agree that if we apply a 3-percent royalty rate to this $114 million, the result would be $3.4 million, right?

A. That's correct.

Q. Now, you testified about Mr. Brunell and the fact that Mr. Brunell would insist upon a 2.5 percent royalty rate. If we apply a 2.5 percent royalty rate to this $114.4 million, the result would be $2.85 million; isn't that right?

A. Through the life of trial -- or through trial, yes.

Q. The answer to that is yes?

A. Yes.

Q. And we saw in the Exar-Hi/Fn acquisition, that agreement included 43 patents at a 2 percent royalty rate. If we take that 2 percent royalty rate from the Exar-Hi/Fn agreement and applied that 2.2 percent royalty rate to the $114.4 million here, that result would be $2.3 million; isn't that right, Mr. Bergman?

A. That's how the math works out, yes.

Q. And if the jury determines that Sandvine does not infringe in this case, the correct damage amount is zero dollars; isn't that right?

A. That's my understanding.

Q. Thank you.

MR. KEAN: No further questions, and I pass the witness.

THE COURT: Redirect, Mr. Davis?

MR. DAVIS: Yes, Your Honor.

THE COURT: All right. Proceed.

REDIRECT EXAMINATION

BY MR. DAVIS:

Q. On cross-examination, Mr. Bergman, you were asked whether 3 percent was considered to be a

reasonable royalty rate in this case, and you asked for an opportunity to explain. I'd like to give you that opportunity now.

A. Sure. So I did an alternate -- alternate analysis, use the Exar-Hi/Fn as a comparable license and did determine that under that methodology, the 3 percent would be a reasonable royalty.

The part where I had issue with the question was that the royalty base in which that would be applied to, in my opinion, is different than the royalty base that's at issue in this case. And so an ultimate royalty is -- is typically made up of two pieces, the royalty rate and the royalty base. And those two things are tied together, so that if you find a royalty rate from a comparable agreement, such as the Exar agreement that's 2 percent, you want to determine what that 2 percent is being applied to and that when you determine comparability, you make sure that you're applying it to the same thing.

So in the Exar-Hi/Fn agreement, the 2 percent rate was being applied to any product that benefitted from the use of the patented technology.

And so in my analysis, not only are the accused products benefitting from the -- from the patented technology, but the other products that we

discussed earlier are also benefitting from the accused product -- technology. So if you want to truly make the Exar agreement comparable to the hypothetical negotiation, you have to not only make sure that the royalty rate is comparable, you have to make sure the royalty base is comparable.

Q. Do you remember on cross-examination when you were asked about how you projected Sandvine's revenue going forward through the life of the patents?

A. Yes.

Q. And you remember when you were asked about the 11 -- you said that you used 11 percent compounded.

Why was that the appropriate number to use to project Sandvine's future revenue?

A. So when you do any projection, you want to make sure that you're covering -- if -- if you're doing a compound annual growth rate, which is what I did in this case, you want to make sure that you're covering the relevant cycle of a company. And because Sandvine releases new products and there's a -- there's a -- a spike in sales for those new products and then over time the sales diminish -- you know, this is similar to when a new iPhone comes out, for example, there's sort of a spike in the sale of those new phones and there's sort of a trail-off.

So the appropriate time period in which to determine a compound annual growth rate is one that matches the cycle of the products that are being released. And based on my review of Sandvine's financials and their -- and the product sales, a seven-year period is not the appropriate period to capture the lifecycle of the products. A five-year period, which was a -- was a much more appropriate period of time to look at.

Q. And you were asked on cross-examination about the Exar-Hi/Fn agreement. You -- and you were asked whether the 2 percent royalty was a rate that you agreed was comparable, and you answered: Yes, with adjustments.

What adjustments did you -- would you make or did you make to that 2 percent royalty?

A. Sure. So the Hi/Fn-Exar agreement, based on the Duff & Phelps analysis, did come to a 2 percent, but as we've discussed here today, in order to make it comparable to the hypothetical negotiation, in order to make it comparable to Sandvine's use of the patents-in-suit, certain adjustments need to be made. I don't think it's appropriate to simply take the number straight out of the agreement and apply it in this case. You have to apply it to the facts and circumstances of

this case.

So taking into account the fact that the products are -- or the -- the patents in this case are assumed to be valid and infringed, weighs in -- weighs to increase that royalty rate.

Having an understanding of all the benefits that are provided by the patented technology to not only the accused products but the related products weigh in increasing that royalty rate.

So, again, taking the facts and circumstances into account, it was my opinion that instead of the 2 percent, the 3 percent was more appropriate.

Q. You were also asked about the number of patents that were included in the Hi/Fn-Exar agreement and asked whether there were 43 patents. And you were asked whether that 2 percent royalty rate included all of those patents, and you responded: It was complicated. Why was it complicated to make that -- to answer that question?

A. It's -- it's complicated. And the reason why it's complicated is that that 43 -- the 43 patents are made up of both foreign patents and U.S. patents. And so the way that Duff & Phelps applied the 2 percent royalty rate to Hi/Fn's revenue is they applied the 2 percent equally to foreign revenue as they did for

U.S. revenue, which means that the royalty rate on the U.S. portion of Hi/Fn's revenue would have been 2 percent. That applies to only the U.S. patents, not the foreign patents.

So while there were 43 patents, a 2 percent royalty rate would have been for the foreign patents, but a 2 percent royalty rate would have been for the U.S. patents. So then you just have the U.S. patents with a 2 percent royalty rate.

And I did look at the U.S. patents, and the -- besides the patents that were acquired by Packet Intelligence that we've already talked about today, there were only three other U.S. patents that stayed with Exar.

One was an application that was abandoned. The second one was a patent whose maintenance fees expired, so it had completely lapsed. It wasn't about a patent anymore. There was only one U.S. patent that Exar still held, and we know from the testimony that Exar wasn't doing anything with these patents anyways. So I didn't give a lot of value to the U.S. portion of those patents, and the foreign patents were already being taken into account for the other 2 percent.

Q. One of the other questions you were asked was you were asked whether you accounted for the difference

between the 43 patents in the Exar-Hi/Fn agreement and the fact that there's only three patents asserted in this lawsuit. Did you account for that in your analysis?

A. I did. And -- and part of that was what I just described taking into account, and then -- and then after looking at the patents that Exar held and kept, we're now left with the Packet Intelligence patents, which we've already analyzed and -- and taken into account.

Q. Now, in your direct testimony, we did not present the analysis that you performed based on the Exar-Hi/Fn agreement, did we?

A. We did not.

Q. Did Mr. Kean ask you what your conclusion was based on that agreement?

A. He did not.

Q. And based on that analysis?

A. No, sir.

Q. You were asked about the number of -- in the Cisco agreement, you were asked about whether you knew what the royalty base was in the Cisco agreement. Do you recall that?

A. I do.

Q. And you were asked about that you -- asked

whether you determined a royalty rate in the Cisco agreement.

Why did you not need to know what the royalty base was to use the Cisco agreement to determine a reasonable royalty in this case?

A. So this goes back to the pizza analogy, right. We know -- we know how much Cisco ate compared to how much Sandvine ate. We know their market share compared to Sandvine's market share. So using the pizza analogy, the royalty base would be the size of the pizza. So that pizza can be gigantic or it can be tiny. It doesn't change the fact that you've eaten twice as much of your co-worker or Sandvine has generated 40.9 percent more in revenue than Cisco. So the base doesn't matter. And the rate and the amount that can be paid can fall out from the analysis of just understanding the market share. So it's unnecessary.

Q. You were also -- also asked whether you knew the number of infringing Cisco products that were sold and whether you knew the amount of revenue associated with those products. Did you need that information to conduct your analysis?

A. I did not.

Q. And, again, why -- why did you not need that?

A. Because, again, because we had this market

share information. We knew the size of the company. We knew the -- the portion of the pie that Cisco had in relation to the portion of the pie that Sandvine had.

Q. You were asked how many times -- if you knew whether -- if you knew how many times Cisco had been sued and how many times Cisco had settled lawsuits. And you said you didn't know. What do we know in this case about Cisco?

A. In this case, we know that they did settle with Packet Intelligence, and they [redacted] for the Packet Intelligence portfolio.

REDACTED BY ORDER OF THE COURT

Q. You were asked towards the end of your cross-examination --

MR. DAVIS: If I could have Slide 60, please, from Mr. Bergman's presentation.

Q. (By Mr. Davis) You were asked towards the end of your cross-examination why you didn't apply 3.4 percent to the $114 million in gross revenue. Why didn't you do that?

A. Again, as I -- as I described earlier, the royalty rate and the royalty base are tied to each other. So you need to make sure that when you're applying a royalty rate, you're applying it to the appropriate royalty base.

And because the application of the royalty

rate in the Exar agreement was applied to any product that benefited from those patents, the $114 million is not the applicable base by which to apply that rate.

Q. And when you, in fact, did find the appropriate base, why didn't you apply the 3 percent that Mr. Kean was asking you about? Why didn't you use that 3 percent in your analysis?

A. Well, the -- the 3 percent was the royalty rate that I determined from the Exar agreement. It just wasn't applicable to this $114 million.

Q. Okay. It was a different agreement, different analysis?

A. Yes, sir.

Q. Okay.

MR. DAVIS: Pass the witness, Your Honor.

THE COURT: All right. Additional cross-examination?

MR. KEAN: Very briefly, Your Honor.

RECROSS-EXAMINATION

BY MR. KEAN:

Q. Now, Mr. Bergman, in your redirect there, you mentioned some other products that were sold by Sandvine. The actual revenue for the actual products that had been accused of infringement in this case is $114.4 million; isn't that right?

A. Through trial, correct.
Q. And you haven't offered any opinions on infringement today; is that right?
A. No, sir.
Q. Thank you.
THE COURT: You pass the witness?
MR. KEAN: Yes, Your Honor.
THE COURT: Is there redirect?
MR. DAVIS: Yes, Your Honor, briefly.

REDIRECT EXAMINATION

BY MR. DAVIS:

Q. Mr. Bergman, one question, why are we doing a lump-sum analysis in this case, or why did you do a lump-sum analysis in this case?
A. Because I think that's what the parties at the hypothetical negotiation would have -- would have demanded.
MR. DAVIS: Pass the witness, Your Honor.
THE COURT: Further cross-examination?
MR. KEAN: No, Your Honor.
THE COURT: All right. Mr. Bergman, you may step down.
Plaintiff, call your next witness.
MR. DAVIS: Your Honor, members of the jury, at this time, the Plaintiff rests.

THE COURT: All right. Plaintiff having rested its case-in-chief, is Defendant prepared to go forward with its first witness?

MR. BURESH: We are, Your Honor.

THE COURT: Call your first witness.

MR. BURESH: Your Honor, we call Don Bowman.

THE COURT: All right. Mr. Bowman, if you'll come forward.

Counsel, has this witness previously been sworn?

MR. BURESH: He has not, Your Honor.

THE COURT: All right. If you'll come around, Mr. Bowman, and have our courtroom -- I'll have our courtroom deputy administer the oath to you.

(Witness sworn.)

THE COURT: All right. Sir, now, if you'll come around and have a seat on the witness stand.

All right. Mr. Buresh, you may proceed.

MR. BURESH: Thank you, Your Honor. May I hand out binders, Your Honor?

THE COURT: You may.

All right. Let's proceed.

DON BOWMAN, DEFENDANTS' WITNESS, SWORN

DIRECT EXAMINATION

BY MR. BURESH:

Q. Mr. Bowman, could you please state your name for the record?

A. My name is Don Bowman.

Q. And before we get started into your testimony, could you just give a little background information about yourself?

A. Certainly. So I grew up on a dairy farm in Canada, just across the border from Rochester, New York. In 1989, I started at the university -- at the University of Waterloo in an engineering program. Part of that program required me to gain a lot of work experience while I was there. And in my last year of school, I left school and joined Hewlett-Packard to work full time where I met some of the co-founders of Sandvine.

Q. Now, what --

THE COURT: Mr. Bowman, let me ask you to speak up a little bit.

THE WITNESS: Certainly.

THE COURT: Thank you.

Go ahead.

Q. (By Mr. Buresh) What was your role at Sandvine?

A. Prior to September 21st of this year, I was

one of the founders of Sandvine, and I was also our chief technology officer.

Q. Well, what happened on September 21st?

A. On September 21st of this year my company was acquired, and as part of that my -- my role ended at the company.

Q. Do you currently have any role at Sandvine?

A. I do not. I'm not currently employed by Sandvine.

Q. Do you own any stock in Sandvine at this point?

A. I don't.

Q. Do you have any financial stake in the outcome of this litigation?

A. I do not.

Q. Are you appearing here voluntarily?

A. I'm here voluntarily.

Q. And why are you appearing voluntarily?

A. I'm here because I was involved in our product from the very start, and I think it's the right thing to do to help defend them.

Q. Now, going back to before September 21st, while you were still at Sandvine, could you describe your role as the -- as the chief technology officer?

A. Yes. So as chief technology officer, I had

three main functions. The first one was external. I spent a very large amount of time at our customers, helping them to understand the technology, helping them to understand how to interact with -- with their customers, how to make their business better.

The second is I spent a lot of time with governments with regulators helping them to understand the telecommunications industry, how our technology interacted with it.

And the third is I spent a lot of time with our -- our engineering team, our research and development team helping to guide their choices in technology selection and architecture.

Q. Now, Mr. Bowman, we've heard a fair amount about the PTS products, and I don't want to get into detail just yet, but did you have a role in developing PTS products?

A. Yes, I did. I was one of the co-inventors, I was one of the first people working on it from the very start.

Q. Now, have you ever testified in court before?

A. I have not testified in a -- in a courtroom in this fashion before.

Q. How about other types of testimony?

A. I have given testimony to the United States

regulator on telecommunications, the FCC, which was done more in a people at the front of the room panel like you see on television.

Q. Have you ever testified before members of Congress?

A. I've testified to members of Congress before, but not in front of Congress.

Q. And what is the FCC, what does that stand for?

A. The FCC stands for the Federal Communications Commission. It's the government entity that regulates telecommunications companies like AT&T and Verizon and Comcast.

Q. And in what capacity were you testifying in front of the FCC?

A. I was there as an expert in technology, specifically around how consumers use the Internet, how many minutes of Facebook, how video streaming worked, and how carriers supplied that service to their consumers.

Q. And could you walk us through in a little more detail your background before Sandvine, your education, and some of your work experience, please?

A. So I -- I went to school at the University of Waterloo in an engineering program. As part of that program, I had to go and work -- so we went to school

for four months and then worked for four months and repeat all the way through. It was called cooperative education.

As part of that, I worked for several different companies along the way. The one that was probably nearest and dearest to my heart was -- was HP -- was Hewlett-Packard. We made network graphics terminals. I worked there for several work terms, and ultimately after some thought and at the end of my third year of university, I decided to join there full time.

After that, I worked at a -- after that, we left HP. We started a company called PixStream. PixStream made video over networking equipment, so it'd allow you to watch television on your home on -- on a telecommunications network which at that time was very new. I think today it's -- it's things like Verizon Fios, but that's ultimately what we invented there. From there, we moved on to Sandvine.

Q. Mr. Bowman, were you one of the founders of PixStream?

A. I was the first employee of PixStream, so I left at the same time as the founders.

Q. At some point did you come to know Mr. Dave Caputo, who is in the courtroom here with us?

A. Yes. I met Dave many, many years ago when I

was much younger at Hewlett-Packard. Dave was there at the same time I was.

THE COURT: Mr. Bowman, let me caution you not to use last names -- I mean, first names only.

THE WITNESS: I'm sorry, Your Honor.

THE COURT: And the reason I do that is it's important that the record is clear. And if we refer to people by first names only, it's almost inevitable that at some later date when somebody reads that transcript, they're not going to be able to tell who was doing what. So please refrain from first names only.

THE WITNESS: I apologize, Your Honor.

THE COURT: Not a problem. Let's continue.

MR. BURESH: Thank you, Your Honor.

Q. (By Mr. Buresh) When did you first meet Mr. Caputo?

A. I met Dave Caputo -- it would have been in 1993 when I was working at Hewlett-Packard.

Q. And did he come to join you at PixStream, as well?

A. Yes, Dave came and joined us at PixStream after about a year and a half or so and formed our marketing department there.

Q. And were you both -- you and Mr. Caputo founders of Sandvine?

A. Yes. Mr. Caputo and myself both were founders of Sandvine, along with three other gentlemen.

MR. BURESH: If we could go to Mr. Bowman's first demonstrative slide.

Q. (By Mr. Buresh) We have seen this picture before, but who -- whose van is this?

A. This is my van. This was -- my vacation the previous year, I traveled across the United States and camped in this. And this is how we unveiled the logo to the team on the first day.

Q. So this is the first day at Sandvine?

A. This was the inaugural day at Sandvine where myself and my friends and co-founders started the company.

Q. And who were the -- who were the other co-founders?

A. At the front of the van appearing to hold it up is Mr. Marc Morin. Sitting in the passenger seat with his arms out the windows is Mr. Dave Caputo. Sitting on the top with the glasses is Mr. Tom Donnelly. On the bottom underneath the logo is Mr. Bradley Siim. And there's myself in the upper left, Don Bowman.

MR. BURESH: If we could go to the next

demonstrative, please.

Q. (By Mr. Buresh) Do you recognize this photograph that's on the screen in front of you, Mr. Bowman?

A. I do. This is one of my favorite days.

Q. What is this depicting?

A. This is us unveiling the logo to the team, unveiling the company name. We've just taken that tarp off. That's what the ladder was all about was unveiling it.

Q. Was this your first offices?

A. Yes. This was where we started the company. This was our first office here.

Q. Mr. Bowman, how -- how did the name Sandvine come about?

A. So Sandvine started and we had made job offers to approximately 40 of our friends from our previous company, people that were now unemployed and we -- we wanted to employ. And we invited each person to submit several names that they thought would be a good company name. And then one of the first activities that myself and the other founders did is we got together, we took pieces of those words, we put them together, looked for things that sounded nice that you could pronounce that was about two syllables long and you couldn't find

commonly on the Internet, and ultimately we chose Sandvine as the name.

Q. What does Sandvine mean?

A. We later learned that a sandvine is a plant. It's something called a milkweed. It's something that the monarch butterfly eats on its migratory path, but we didn't know it at the time. It also turned out to be a weed, but we don't mention that as commonly.

Q. Now, at the beginning of Sandvine, I think we heard testimony from Mr. Caputo yesterday about a global services engine. Are you familiar with that?

A. I'm very familiar with it.

Q. Was that the first product at Sandvine?

A. That was our first product idea, the global services engine, yes.

Q. And how did the global services engine turn out at Sandvine?

A. Ultimately, I think it was relatively good technically. We were commercially unsuccessful with it. We never ended up selling any, and we withdrew it from the market prior to us a hundred percent finishing it.

Q. Now, the first product family, what did that mean for the company?

A. It was a hard time for us. I mean, we -- we -- we didn't have a lot of money. Myself and the

other founders, we stopped drawing a salary for about eight months or so. We were concerned about our future, but we kept plowing ahead with the other ideas that we'd been working on.

Q. What were some of the other ideas?

A. We were incubating an idea that was ultimately a way to make a certain type of Internet traffic faster, and ultimately we had some success there and started to sell that product.

Q. At some point, did you come to a product called the PTS or Policy Traffic Switch?

A. Yes. As part of that first product that had some success, we came to understand it was a lack in the market, a specific business need. And after a fair bit of research into other networking equipment providers, we couldn't find anything that would satisfy that need. So we decided to build it.

Q. What -- what time frame are we talking about that the PTS was in first development?

A. The PTS idea came about towards the end of the summer of 2002 into the early fall of 2002.

Q. Could you describe the process by which you came up with the PTS product?

A. So the PTS product, like nearly everything I've done in my career, was a collaborative event. So

there was another person by the name of David Dolson. He and I -- I've worked with him -- he was at university with me. I've known him for -- for way more than half my life. He and I sequestered ourselves to one of our meeting rooms, and we used what's called a whiteboard. It's like a chalkboard, but you use markers on it. And we went back and forth over this -- this requirement that -- that had come in from our customers, how we were going to solve it, until we came up with a target architecture, and then we went away and built it.

Q. What do you mean by built it?

A. So by this stage, we added a third person to the project, Michael Marchetti. And the three of us had to write what's called source code. Source code is a set of instructions to a computer system. It's written in a language that is human readable, but is also more importantly, machine readable.

Q. Now, did you actually build, I guess what I'd call, a prototype?

A. Yes. So one of our concerns was were we right.

The second concern was would it work? You want to normally build a prototype and try it in a real world before you commit too much resources to that. So in the first three to five months, we struggled to get

something out the door that we could try at a friendly customer, which we ultimately did.

Q. So that process of getting to a prototype took three to five months?

A. Approximately. I can't recall the exact amount of duration.

Q. And during that three to five months, were you working 9:00 to 5:00, or what did that look like?

A. Those were some of the hardest, longest hours of my have life and my friends' lives. We worked weekends, evenings. That was our passion was building this.

Q. Now, you mentioned source code, I believe.

A. Yes.

Q. Did you personally participate in -- do you call it writing source code?

A. We do.

Q. Did you personally participate in writing source code for the PTS products?

A. Yes. I wrote some of the source code for the early PTS.

Q. Was that code written from scratch?

A. It was. We couldn't find anything that did this. As a consequence, we had to write it all ourselves.

Q. Now, this was -- if I'm doing my math right, about 15 years ago?
A. Yeah, that's right.
Q. Now, have you stayed familiar with the PTS source code through that 15-year period?
A. Yes. The three job responsibilities I had at Sandvine, helping our customers understand the internals, how it interacted with, helping regulators understand how equipment like ours worked, but most importantly, helping our fairly large, by this stage, our R&D team select technology and -- and move ahead in architecture, has required me to stay current in it.
Q. Now, you mentioned there were three individuals that worked on the PTS originally; is that correct?
A. That's correct.
Q. Now, did the team stay that size as the development continued?
A. No, we -- as we started to get customer attraction, we quickly had more work than three of us could -- could do. And by the end -- by the time I left Sandvine, there was well over a hundred people working on specifically that product.
Q. A hundred engineers?
A. Well, over a hundred engineers were working on

that project, yes.

Q. How many engineers are there at Sandvine? Again, this is before September 21st.

A. I don't remember the exact number, but it would have been around 325 to 350 technical staff engineers working on it.

Q. So of the 325 total engineers, about a hundred worked on the PTS?

A. That's correct.

Q. I want to go back -- you described a -- a whiteboarding process?

A. I did.

Q. Is that correct?

I want to go back to the whiteboarding process.

At that stage, what were your design goals for the PTS products?

A. So Dave and I -- David Dolson and I had a fair bit of experience with networking, but we didn't have a lot of experience with what's called consumer networking, so we were more experienced in a business environment, small office.

The problem with consumer is it's much larger. There's many millions of users.

And we were very concerned about three things.

One was performance. The Internet was growing very rapidly, and we didn't want to be something that slowed it down.

The second was complexity, the Internet was evolving very, very quickly in 2002. There was many new applications coming out, and we were concerned that we would build a product that would be too difficult to create or maintain.

And the third was reliability. We were worried that we would make a mistake, and we would cause a problem for our customers. Those were the three big concerns that we had.

Q. I believe the first one you mentioned was performance; is that correct?

A. Yes.

Q. You might describe that as just speed. Is that a fair description?

A. It's correct.

Q. Why is speed important in the PTS products?

A. So the PTS product sits between your house and the services that you enjoy on the Internet, so Netflix, Facebook, et cetera. If our product wasn't fast enough one of two bad outcomes would occur. Either it would slow down your -- your Netflix, it would stall, your web page wouldn't load fast enough, and no one would have

bought that product. Or alternatively, our customers would have needed to buy too many of them. It would have taken up a lot of room, and it would have taken up a lot of power. It would have been too expensive, and we wouldn't have sold any. So neither would have been an acceptable outcome, so we were very worried about performance.

Q. And I know you haven't been in here, but we've talked a lot about iPhone. Can you describe from a smartphone perspective what a user would experience if PTS products were not fast?

A. So I think we've all experienced a slow Internet. But you imagine you click on something and that web page takes time to load. The longer it takes to load, the less happy you are. That's a function of the speed of the Internet between you and a service that's somewhere else in the world, perhaps California. You think about it from a YouTube standpoint. You think of that YouTube video taking longer to start or stalling in the middle of it or maybe being fuzzy because it had to switch to a lower speed in order to achieve its goal. That's what would happen if products like ours were not quick enough in the middle.

Q. And if products like yours were not quick enough in the middle, could they be commercially viable?

A. Probably not. I mean, if you -- if -- if one product isn't fast enough, you can do what's called load balancing across many of them, but then it gets complex and expensive. And it's unlikely you'd be successful if you weren't fast enough, no.

Q. So how did you -- how did you accomplish your speed goals for the PTS products?

A. So this was a subject of a large amount of discussion between Dave Dolson and myself. What we settled on is we made a -- we made a -- an observation that the Internet protocols were composed of two different things. The first was something that was always the same. It was standards. It didn't change. And the second was something that was changing very rapidly. It was at the hands of the many application developers.

We made that observation, and we decided to split our software into two components, one which did one thing very, very rapidly based on that simple standard component, and one which handled all of the complexity, the change that was happening out there in the world. And that was the main architecture that we settled upon.

Q. Now, you mentioned the standard component. What is a standard component?

A. So Internet standards -- the Internet is composed of two types of things. There's things that are agreed upon by -- by committees of academics and industry, so there's something called the Internet Engineering Task Force is the primary, it's called a standards body.

A standard is something that's written down, and everybody agrees to do exactly the same way. So you think about you buy an electrical appliance, you know it will plug into your outlet at home because there's a standard for how far apart the pins are. That's what a standard is.

Q. Is there a standard component in packets on an IP network?

A. There are several standards. So the -- the first standard is what's called -- sometimes called layer three or address, an IP address. And that's how you find a given device or an end point. So that's the address of your phone.

And the second standard that we cared about was what's called the transport protocol, and that's sort of like the -- the language they talk to each other on that, and there's one called the transport control protocol, or TCP, which is the most important there. Those standards have been very firmly done since the

early to late 1970s. They've been around a long time.

MR. BURESH: If we could pull up the next demonstrative, please?

Q. (By Mr. Buresh) Mr. Bowman, did you provide a sketch to me of your PTS products' architecture?

A. I did.

Q. And does this demonstrative accurately reflect the sketch you provided?

A. It does.

Q. What are we looking at here from the product -- from the perspective of the PTS products?

A. So this is two different software modules. So module is a large group of functionality that a single team would work on without having to interact too much with another team. You can think of it as like a part in a car, the steering wheel team might be different than the engine team.

There's two different main components inside the PTS. This is all inside the same product. The first is what we call a PTS module. It's the part that is the very fast part. And the second is called the PTS Daemon which is the part that handles that high complexity. This is the high-level software architecture we worked out on that whiteboard in 2002.

Q. What is the primary purpose of the PTS module?

A. The primary mission of the PTS module is to do two things. Every single packet -- every piece of information from your phone to the Internet flows through it, so it goes in one side, and it goes out the other.

And the second is to create or look up what are called connection flows based on that information.

Q. I see the -- the title of this has Fastpath in it, do you see that?

A. I do.

Q. Do you call the PTS module the Fastpath?

A. Yes, we very commonly in networking products, and specifically inside Sandvine, refer to things as the Fastpath. The Fastpath is the part that is most performance critical. Every packet goes through it, millions of packets per second happen there, a very small delay would have a very large impact. So the PTS module is the Fastpath of the Sandvine system.

Q. And this blue line we're looking at, that would be the in and out, front door and back door?

A. Yes, you could consider that your house is on the left-hand side of a PTS and that the Internet services that you access are on the right-hand side, and the blue line is the path from your house to the Internet. That's the best way to look at this.

Q. Where in this depiction on your screen are flows created in the PTS products?

A. The PTS module is responsible for the creation of connection flows.

Q. Are there any other types of flows created in the PTS module other than connection flows?

A. No, the only type of flow that Sandvine has is called a connection flow.

Q. Now, the PTS products overall, how much of the PTS products are about this flow creation or identification process?

A. There would be less -- less than 5 percent of the software of that source code would be related to connection flow management, et cetera.

Q. And what is the primary purpose of the PTS Daemon?

A. Daemon.

Q. What is the primary purpose of the PTS Daemon?

A. The PTS Daemon is primarily responsible for the identification of the application ID of a connection flow. So you think about using your device and you use five applications, Facebook, YouTube, Gmail, the PTS Daemon is responsible for saying this connection flow is Facebook, not Gmail. That's its responsibility.

Q. Does the PTS Daemon have anything to do with

flow identification?

A. The PTS Daemon is responsible solely for identifying the application of the connection flow. It's not responsible for identifying that a packet belongs to a connection flow.

Q. Going back to the PTS module, what information is used in the PTS module to identify a flow?

A. So going back to that observation, the Internet has a very standards-based component. There's a component that's present in every packet. It's called the 5-Tuple. The 5-Tuple is five separate pieces of information. The source address, that's your phone. The destination address, that's Facebook. The source port, you could think of that as like the extension in your house, the kitchen phone versus the living room phone; and the destination port, you could -- about like an extension at a company you call -- call a travel agent and ask for Extension 50. And then the protocol, TCP -- in this case, the application protocol. Those five coordinates uniquely identify a connection flow. That's how the PTS module creates the connection flow, and those are present on every packet.

MR. BURESH: If we could turn to the next demonstrative, please?

Q. (By Mr. Buresh) And did you provide me with a

sketch of how you would describe connection flows using a Facebook example?

A. I did.

Q. And is this demonstrative an accurate depiction of that sketch?

A. Yes, it is.

Q. Could you describe for the jury how a connection flow works using a Facebook example?

A. So I'm sure many of you have used Facebook, and you -- you know that when you open the Facebook application, there's different things that are showing to you on the screen. So imagine that it's showing you a friend's photos. They've shared their vacation pictures. Imagine that it's showing you an advertisement, and imagine it's showing you the ability to open a video. Each one of those pieces of information could be and in general is stored on a different computer inside Facebook. Facebook would be located in -- in a different building.

So what happens is when you open a Facebook application and you select the Facebook app, it starts up and it creates the first connection flow, the photos. You can imagine that being in a specific spot on the screen, perhaps the upper left.

The -- then it opens the coupons or

advertisements. That might be at the bottom of the screen. And then the video. Each one of those is going to have those same five unique coordinates to make the connection flow. The source address, my phone; the destination address, Facebook's photo server, the coupon servers, the video server; the source port, that location on the screen; the destination port, that's where your photos versus a friend's photos are on the server; and then that transport protocol which is nearly always TCP. That's how this works.

Q. And a 5-Tuple is contained in every packet?

A. Every packet has those same five pieces of information present on it. It's how they're routed around the Internet today.

Q. And does a 5-Tuple uniquely define a connection flow?

A. That's right. A single connection flow has a 5-Tuple, and no other connection flow has the same 5-Tuple. It's unique in the universe. It's unique across all Internet service providers. It's unique across all devices. It's always unique.

Q. Do the PTS products use anything other than this connection information to define a flow?

A. No. This is the only information that PTS uses. It uses this -- back to that architectural

performance standpoint, it always uses this 5-Tuple information. It's all it uses.

MR. BURESH: If we could -- if we could turn to the next demonstrative, please.

Q. (By Mr. Buresh) Now, Mr. Bowman, did you provide me with a sketch to describe how the PTS products store flow-entries?

A. I did.

Q. And is this Demonstrative 5 an accurate depiction of the sketch you provided me?

A. It is.

Q. Can you describe for the jury how the PTS products store connection flows in the flow table?

A. So if you look at the left edge of this chart, time is going from left to right across it. And the connections are going top to bottom. So imagine the sequence of events. You open your phone, you turn it on, you press the Facebook button. The very first thing it does is it starts a connection flow to the Facebook photo server. That creates a packet. That packet is a piece of information that flows from your phone towards Facebook.

Along the way, that packet comes into the PTS. And the PTS looks up those five fields: Source IP, that's your phone; destination IP, that's the server;

source port, the photos's location on your phone; destination port, location of your photos on their server; and transport protocol.

It -- it sees does flow exist? Is this connection flow something I've heard of before? The answer is no. So it allocates it a spot to hold it. In this case, it's chosen the first row in this table, Connection Flow 1, and then it let's the packet go.

The second packet that comes in might be from the coupon server, the advertisement server. Same process. It looks at it and says source address, destination address, source port, destination port, and protocol.

Do I have a connection flow for this? The answer is no. Okay. I'm going to create one. In this case, it chooses to put it in the fourth row in this table.

Third packet comes in, comes in from the video server. Do I have a connection flow for this? I look up the source IP of the phone, the destination IP of the server, source port, destination port, and protocol. Creates an entry, in this case, in the sixth row.

Another packet comes in, and this one is, again, from the photo server. It looks it up. Do I have a connection flow for this? And it says, yes, and

it assigns it to the same row as in the earlier step. And it repeats until you have all the information on your screen. That's how it works.

Q. Now, Mr. Bowman, is there a -- in the flow table in the PTS products, is there a flow-entry for every connection flow that the PTS product has encountered?

A. Yes, every single connection flow in general that is currently active on the Internet will have one entry in this table.

Q. And what is used to assign packets to a particular flow-entry?

A. Packets are assigned to a flow-entry based on that 5-Tuple, those five coordinates we've been talking about.

Q. And I see here you have application ID on the right-hand side of your demonstrative?

A. I do.

Q. When is that application ID filled in?

A. The application ID is filled in by that PTS Daemon, which is something that runs later. And it runs after the first few packets but only on -- only on the next few. In general, it's filled in on the fourth or fifth or sixth packet, the first three packets being standards-based and having no -- what's called a

signature in it. So it's something we know a little bit into a flow, but not at the very beginning.

Q. Is the flow created before the application is known?

A. The flow is created on the very first packet before we know the application ID, so, yes.

Q. How is -- is -- is the application ID used in any way to assign packets to a flow?

A. No. The application ID doesn't define the connection flow. The connection flow is solely defined by the 5-Tuple information. I couldn't do it any other way because the application ID isn't known on the first packet. It's not knowable.

Q. Now, Mr. -- Mr. Bowman, is there any way in the PTS products to group these three Facebook connections together?

A. No, it's not possible in the PTS to group connection flows together. There's no entry in the table that says this row has a pointer to another row. You can see here there's no column called another connection flow. It -- it doesn't have that ability.

Q. Do the PTS products have any ability to link these three flows together?

A. No, the PTS products do not link these three flows together.

Q. Do the PTS products relate these three flows together?

A. We do not relate these flows together, no.

Q. Why did you -- why did you design the PTS products this way?

A. This goes back to that earlier concern about performance. The more work you do, the slower you get. So you can imagine that if the PTS module had to do work to say, this flow, is it related to another one, if so, you must somehow link them and keep their stats up-to-date, that would slow it down, and we didn't want to be slow. We needed to be fast to be successful.

So, therefore, we decided that there was no point in trying to link one connection flow to another. We didn't need it for our application. The application identification was all we cared about, and that was on a per connection flow basis.

Q. Now, Mr. Bowman, in a -- in a real PTS product -- and I think we've seen some different sizes, so let's take the smallest one. How many -- how many flow or how many flow-entries can there be in the flow table of a PTS product?

A. So the PTS products, they vary dramatically in size in that connection table. The earliest ones we launched had approximately one million connection

flow-entries, and the later ones were well over a hundred million flow-entries, so a very large amount was present.

Back to that concern about performance, the consumer Internet is a big place.

Q. In the real world, would a Facebook activity have more than three connection flows involved?

A. Yes. Facebook would always have quite a number of flows running.

Q. Like how many? Just give me an estimate.

A. It's going to depend on the application on your device, but it could easily be as high as 50.

MR. BURESH: If we could go to the next demonstrative, please.

Q. (By Mr. Buresh) Now, in this flow table depicted here, what are we seeing, Mr. Bowman?

A. So what we're seeing here is a larger depiction of the earlier -- earlier work, but they've added an additional application. So you can imagine an ESPN application, you can imagine somebody running Netflix or YouTube, and you can see that very rapidly you get a very large number of connection flows, even for a single user, let alone a million consumers, you get a lot a -- a lot of connection flows.

Q. Now, in a -- in a PTS product would the Bob's

phone and Facebook connection flows, would they be located near each other in the flow table?

A. No, the design of our system guarantees that they will not be adjacent or even near each other. It's a specific aspect of the algorithm we used, which is called a hash. But effectively, it -- it spreads the connection flows out uniformly across this table. It's a way to achieve higher performance.

Q. And if you wanted to know how much data Bob's phone had sent or received, how would you go about finding that?

A. So in our system, if you -- if I wanted to know how many bytes, how many -- how much data a single user has sent and received, what I would do is I would start at the top of the table, and I would go down through every single row.

So on Row 1, I would say is this user's Bob's data, does this connection flow belong to Bob?

If yes, I would add their data to a counter.

I would go to the second row, does this row belong to Bob?

No, ignore it.

And I would continue until I got to the very end. I would do all of those one million, two hundreds of millions of rows to get a counter that would say this

is the sum of Bob's data. That's how we did it in our system.

Q. So in order to find Bob's phone data in the example where there's a million flow-entries, would you have to walk across all million of those?

A. You would always have to walk all million flows because you wouldn't know which ones belong to Bob or not until you visited each row.

Q. Now, are you familiar with the rice example I used in my opening statement?

A. We discussed it in prep, yes.

Q. And, Mr. Bowman, you understand connection flows, as I said, were like loose rice in my hand, do you remember discussing that?

A. I do.

Q. Is it fair to say that searching through a million flow-entries to find connection flows is similar to dropping a hundred grains of rice in some grass; is that fair?

A. Both would be time consuming and complex activities, yes.

Q. Why would Sandvine have designed its products in a way that's like dropping rice in grass? Why would you design it that way?

A. It goes back to that original performance

constraint. There's one operation, which I'm doing very, very rapidly, which is creating and looking up connection flows. We're doing that millions of times per second. Every single packet of every user of every application I have to do that. It's called the Fastpath.

But counting the number of bytes that a single user has done, we only do that once per hour. So it's much, much cheaper for me to do something once an hour even if that's a very expensive activity, than it is to do something every single time millions of times per second.

The tradeoff that we made in our system was it was slower to do what's called compiling of statistics, but much faster to create an update connection flows. And Mr. Dolson and I thought that that was a really good tradeoff for our product when we discussed it in that summer of 2002.

Q. Why would you not want to put a net around the rice? Why would you not want to group Bob's connection flows together?

A. That would have taken time on every single new connection flow. That would have been the tradeoff we didn't want to make. We would have slowed down the common case to speed up the uncommon case. I don't see

why we would want to do that. It didn't make sense.

Q. If you wanted to group Bob's phone connection flows together, would that have changed your system design?

A. Our system would have been very different if we had chosen to do some grouping of connection flows. I'm not sure what it would look like.

Q. And if you in some way put a net around Bob's connection flows, how would that have impacted the performance of the PTS products?

A. The performance would have been much lower. I mean, 10, 20, 30 percent lower. It would depend on exactly how we came up to do that, but we would be doing something millions a time a second that we didn't need. It would slow it down quite a bit.

Q. How did you keep the Fastpath fast?

A. We stuck to our guns, we stayed by that original architecture. We tried to keep the minimal amount of software present in that Fastpath, just the bits that were needed to create and assign packets to connection flows. And everything that didn't need to be done in every packet, we moved it to the Slowpath, and we did it less frequently. That's how we kept our performance.

Q. In the PTS products, Mr. Bowman, do you define

flows in any way other than connection flows?
A. No, the sole way we define a sole (sic) is based on the term "connection flow" is based on that 5-Tuple.
Q. And do you define flows or identify flows using anything other than connection information?
A. No, the sole way we define or identify a connection flow is placed on the 5-Tuple information.
Q. I'd like to introduce now Defendants' Exhibit 221.
MR. BURESH: If you could pull that up for me.
Q. (By Mr. Buresh) Do you recognize this document, Mr. Bowman?
A. I do.
Q. And what is it? Is it a Sandvine document?
A. Yes, this is a -- an external document of Sandvine's which means we made it available on our website. We make it available to our customers. This is a document that they use to understand how many of a product they would need for capacity, for performance. It's called dimensioning.
MR. BURESH: And if we could move forward in the document, please.
Q. (By Mr. Buresh) And we're looking now at

Bates No. Sandvine 937263. Do you see that?

A. I do.

Q. Under Section 1.1, the third paragraph in, could you read this for the jury, please?

A. This says: A flow is a set of five things, source and destination IP addresses, source and destination ports, and layer 4 protocol, TCP, UDP, et cetera, that uniquely defines a sequence of packets.

Q. And what do you understand -- do you understand a sequence of packets to be a general description of a flow?

A. That would be what we call a connection flow, yes.

Q. And the source destination IP address, ports, and layer 4 protocol, that's the 5-Tuple; is that correct?

A. That's right, that's the 5-Tuple we've been talking about this morning.

Q. Is this an accurate reflection of how Sandvine defines flows in its PTS products?

A. Yes, this is exactly how we define a connection flow in our product. This is what we've been talking about.

Q. Now, you're aware of when this lawsuit was filed?

A. I don't remember the exact date, but it was early in 2016.
Q. And when was this document dated?
A. This document is June 18th, 2013.
Q. So being the genius I am, 2013 is before 2016?
A. Yes.
Q. So this document was in existence at Sandvine defining a flow at Sandvine before this litigation ever came about?
A. Yes.
Q. And this document provides an accurate description of a flow that's utilized in the PTS products?
A. Yes, this is accurate.
Q. Has that definition of the connection flow ever changed from the inception of the PTS products to today?
A. No.
MR. BURESH: I'd like to pull up next DX-219.
Q. (By Mr. Buresh) Now, Mr. Bowman, on the screen in front of you is an email; is that correct?
A. That's correct.
Q. Can you describe who and -- to whom and from whom this email is transmitted?

A. This is an email from Richard O 'Halloran, who at that time was a sales person working for Sandvine in Japan. And it's sent to myself and also to Alex Hoff who was on my team at that time.

Q. Now, this Richard O'Halloran, was he a technical guy at Sandvine?

A. Richard O'Halloran was a sales -- an account manager for Sandvine.

Q. Was he an engineer?

A. He was not.

Q. Did he provide an attachment to this email that he sent to you?

A. Yes, there are two attachments labeled Application Traffic Analysis.doc, and SPB Internals.doc.

Q. And before we -- we leave this, Mr. O'Halloran asked you: Did you get a technical writer?

Do you see that?

A. I do see that.

Q. What was he asking you?

A. There -- he was asking if I had a person on my team that would be able and willing to write some more detailed internals documents for our customers to make them more consumable.

Q. Now, this application traffic analysis, that's the title of the attachment; is that correct?

A. That's one of them, yes.

MR. BURESH: If we could turn next to PTX-381.

Q. (By Mr. Buresh) Is this the attachment that we just saw to that email?

A. Yes, it is.

Q. And it has SAVEDATE, and then no dates in this; is that correct?

A. That's correct.

MR. BURESH: If you could advance, please, to the next section.

Q. (By Mr. Buresh) Now, this is some language we actually saw yesterday from Dr. Almeroth, citing to this document. And, Mr. Bowman, my question for you: Is this document providing a technically accurate description of how priming operates in the PTS products?

A. No, this is not accurate, this document.

Q. Was Mr. Halloran (sic) the author of this document?

A. That is my understanding, yes.

Q. And he wasn't a technical writer; is that correct?

A. He was not.

Q. Is -- and I'm going to look at the first sentence now for your reference. In priming in the PTS

products, does it pre-create a flow state within the PTS?

A. No. We have no method of pre-creating a flow state within the PTS.

Q. Can it creep -- excuse me, can it pre-create a flow state based on known 5-Tuple information?

A. No. There will be no way to know in advance what the 5-Tuple information would be.

Q. Is this description of priming wrong?

A. Yes, this is just wrong.

THE COURT: Counsel, approach the bench, please.

(Bench conference.)

THE COURT: Where do you estimate you are on your direct, Mr. Buresh?

MR. BURESH: I have about another 20 minutes, Your Honor.

THE COURT: All right. Well, we're going to break for lunch at this time and finish when we come back.

MR. BURESH: Okay. Thank you, Your Honor.

(Bench conference concluded.)

THE COURT: Ladies and gentlemen, based on the anticipated additional testimony from this

witness, I think we're going to break at this time rather than continue. We're going to have a lunch break.

Would you take your notebooks with you to the lunch -- the jury room and keep them in your possession? We're going to have a little longer break today based on some other things the Court's got to do while you're out at lunch. I'm planning to reconvene at 10 minutes after 1:00.

During this lunch break, follow all the instructions I've given you throughout the trial, including, of course, not to discuss the case among yourselves or with anyone. Lunch is waiting for you in the jury room, and the jury's excused for lunch at this time.

COURT SECURITY OFFICER: All rise for the jury.

(Jury out.)

THE COURT: All right. The Court stands in recess for lunch. We'll reconvene at 10 minutes after 1:00. The Court's in recess.

(Recess.)

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CERTIFICATION

I HEREBY CERTIFY that the foregoing is a true and correct transcript from the stenographic notes of the proceedings in the above-entitled matter to the best of my ability.

/s/Shelly Holmes _117/17_____
SHELLY HOLMES, CSR, TCRR Date
OFFICIAL COURT REPORTER
State of Texas No.: 7804
Expiration Date: 12/31/18